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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/535,652	01/30/2006	Mark G. Mortenson	BKL: 114 (c) US	7037
<div>7590 01/25/2007 Law Offices of Mark G Mortenson PO Box 310 North East, MD 21901</div>			<div>EXAMINER FICK, ANTHONY D</div>	
			ART UNIT	PAPER NUMBER
			1753	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		01/25/2007	PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/535,652

Applicant(s)

MORTENSON, MARK G.

Examiner

Anthony Fick

Art Unit

1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 November 2006.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 November 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 11/9/06
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application
- ☐ Other: _____

DETAILED ACTION

Remarks

1. Applicant's amendments to the drawings and specification have overcome the previous objections.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 2, 8, 11-13, 16 and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 2, at line 1, the word "said" should be inserted after "wherein" so as to clearly refer back to the at least one means for modifying sunlight that is recited in parent claim 1.

At line 1 in claim 8, in claim 11 at line 4, in claim 16 at line 1 and bridging lines 1 and 2, and in claim 20 at line 5, the term "substantially all" is indefinite because it is subjective. It is suggested that "substantially" be deleted from said term.

At line 3 in each of claims 11, 12, 13, and 20, the term "substantially symmetrically" is indefinite because it is subjective. It is suggested that "substantially" be deleted from said term.

Claim 8 recites that at least one frequency of claim 7 comprises substantially all frequencies. It is unclear as to the meaning of this claim. Is the claim stating that all

Art Unit: 1753

frequencies interfere with the solar cell or is there a limited set of frequencies? The claim does not specify anything about these frequencies and thus is indefinite.

Claim 11 recites the limitations "said at least one primary band gap width" and "said plurality of primary frequencies". There is insufficient antecedent basis for these limitations.

Claim 12 recites the limitation "each harmonic frequency". There is insufficient antecedent basis for this limitation.

Claim 13 recites the limitation "each heterodyne frequency". There is insufficient antecedent basis for this limitation.

Claim 20 recites the device of claim 14, while claim 14 is a method claim. It is unclear whether claim 20 is a device or method claim.

Claim 20 recites the limitations "said at least one primary band gap width" and "said plurality of primary frequencies". There is insufficient antecedent basis for these limitations.

Claim Rejections - 35 USC § 102/103

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

Art Unit: 1753

the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-14, 17, 18 and 20 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Samulon et al, U.S. Patent 3,076,861.

With respect to claims 1 and 14, Samulon et al teaches a solar cell having an integral filter element (22), i.e., instant at least one means for modifying sunlight, that transmits only those wavelengths of incident solar radiation which are useful for conversion by the solar cell into electrical power (see col. 1, lines 13-72; and Figure 2). The other wavelengths of solar radiation, which are ordinarily dissipated in the form of heat in the solar cell without producing any useful electrical power, are reflected from the cell (see col. 2, lines 56-70). Figure 3 of Samulon et al shows that the filter element limits reception by the solar cell to that band of wavelengths for which the solar cell has maximum response (see col. 3, lines 48-69). Thus, it is the Examiner's position that said filter (22) minimizes the amount of destructively interfering wavelengths incident on the silicon wafer (12). It is also the Examiner's position that light that is passed through to Samulon et al's solar cell inherently includes the instant harmonics and heterodynes. By using the filter, Samulon has made a determination as to the desirable and undesirable energies that can be applied to the solar cell. The substrate (14,16) of Samulon et al's solar cell is silicon wafer, i.e., crystalline silicon (see col. 1, lines 13-28; and col. 2, lines 31-42). Samulon et al's Figure 3 shows what is well known in the art, i.e., that silicon has a primary band gap corresponding to a primary wavelength of 1.1 microns.

Art Unit: 1753

With respect to claims 3 and 4, Samulon et al's filter element (22), which covers a surface of the solar cell, corresponds to the instant means for modifying sunlight (see Figure 2 and 3; and col. 2, lines 55-70).

With respect to claim 5, semiconductor substrate (12) for Samulon et al's solar cell is made from silicon wafer, i.e., crystalline silicon (see col. 1, lines 13-28; and col. 2, lines 31-42).

With respect to claims 6 through 9, the integral filter element (22), i.e., instant at least one means for modifying sunlight, transmits only those wavelengths of incident solar radiation which are useful for conversion by the solar cell into electrical power (see col. 1, lines 13-72; and Figure 2). The other wavelengths of solar radiation, which are ordinarily dissipated in the form of heat in the solar cell without producing any useful electrical power, are reflected from the cell. Figure 3 of Samulon et al shows that the filter element limits reception by the solar cell to that band of wavelengths for which the solar cell has maximum response (see col. 3, lines 48-69). Thus, it is the Examiner's position that said filter (22) minimizes the amount of destructively interfering wavelengths incident on the silicon wafer (12), e.g., it reduces the amount of sunlight which does not correspond to the harmonics and heterodynes.

With respect to claims 10-13 and 20, the filter transmission is symmetric (as seen in Figure 3), and corresponds to the instant plurality frequencies of light, plurality of harmonics, and plurality of heterodynes.

With respect to claims 17 and 18, figure 3 shows the solar spectrum comprising from about 300 nanometers to about 1400 nanometers.

While Samulon discloses prevention of undesirable wavelengths, applicant's claims state the prevention of undesirable frequencies. This limitation does not differentiate the present application from the prior art; the wavelength and frequency of electromagnetic radiation are interchangeable terms (each wavelength has a corresponding frequency and vice versa). Thus Samulon is restricting the corresponding frequencies from reaching the solar cell.

Since Samulon teaches the limitations of the instant claims, the reference is deemed to be anticipatory.

In addition, the presently claimed requirement of reducing negative interactions within the solar cell photovoltaic substrate material relative to unfiltered light, and the instant harmonics and heterodynes would obviously have been present once Samulon et al's solar cell has been provided and used. Note In re Best, 195 USPQ at 433, footnote 4 (CCPA 1977) as to the providing of this rejection under 35 USC 103 in addition to the rejection made above under 35 USC 102.

7. Claims 1-14 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Strebkov et al, U.S. Patent 4,151,005.

Strebkov et al teaches a photovoltaic generator whose surface is covered with a protection layer which receives direct incident radiation and passes the photoactive part of the spectrum thereof to the operating surface of the photovoltaic generator (see abstract; and col. 8, lines 29-52). The protection layer protects the photovoltaic generator from radiation effects which are liable to damage the semiconductor and

Art Unit: 1753

lower the performance of the photovoltaic generator (see abstract; and col. 8, lines 29-52). Thus, it is the Examiner's position that negative interactions in the semiconductor of the photovoltaic generator having the protection layer will be reduced relative to the semiconductor of a photovoltaic generator that does not have the protection layer. It is also the Examiner's position that light that is passed through to Strebkov et al's photovoltaic generator inherently includes the instant harmonics and heterodynes. By using said protection layer, Strebkov et al has made a determination as to the desirable and undesirable energies that can be applied to the solar cell, as per instant claim 14. The substrate (6) of Strebkov et al's photovoltaic generator is silicon wafer, i.e., crystalline silicon (see col. 7, lines 19-28; and col. 21, lines 17-36). Since Strebkov et al teaches the limitations of the instant claims, the reference is deemed to be anticipatory.

In addition, the presently claimed requirement of reducing negative interactions within the solar cell photovoltaic substrate material relative to unfiltered light, and the instant harmonics and heterodynes would obviously have been present once Strebkov et al's photovoltaic generator has been provided and used. Note In re Best, 195 USPQ at 433, footnote 4 (CCPA 1977) as to the providing of this rejection under 35 USC 103 in addition to the rejection made above under 35 USC 102.

8. Claims 1-4 and 6-14 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Hashimoto, U.S. Patent 4,963,196.

Hashimoto teaches an organic solar cell comprising an organic photoconductive layer comprising a charge generating substance and a charge transporting substance,

Art Unit: 1753

and a protective layer covering the organic photoconductive layer blocking low wavelength light of below 450 nm (see abstract; and col. 1, lines 48-65). Because of the presence of the protective layer, a change in photo-current due to photo-degradation of the charge transporting substance is suppressed while maintaining a high photo-electric conversion efficiency (see abstract; and col. 1, lines 48-65). Thus, it is the Examiner's position that negative interactions in the charge transporting substance of an organic solar cell having the protection layer will be reduced relative to the charge transporting substance of an organic solar cell that does not have the protection layer. It is also the Examiner's position that light that is passed through to Hashimoto's solar cell inherently includes the instant harmonics and heterodynes. By using said protective layer, Hashimoto has made a determination as to the desirable and undesirable energies that can be applied to the solar cell, as per instant claim 14. The substrate (2,3) of Hashimoto's organic solar cell is organic semiconductor (see Figure 1; and col. 3, line 50 through col. 4, line 59). Since Hashimoto teaches the limitations of the instant claims, the reference is deemed to be anticipatory.

In addition, the presently claimed requirement of reducing negative interactions within the solar cell photovoltaic substrate material relative to unfiltered light, and the instant harmonics and heterodynes would obviously have been present once Hashimoto's organic solar cell has been provided and used. Note In re Best, 195 USPQ at 433, footnote 4 (CCPA 1977) as to the providing of this rejection under 35 USC 103 in addition to the rejection made above under 35 USC 102.

Art Unit: 1753

9. Claims 1-14 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Aguilera et al, U.S. Patent 6,107,564.

Aguilera et al teaches a cover for a solar cell, wherein the cover comprises a bandpass filter and usually also has an ultraviolet reflecting coating and a heat reflecting coating (see abstract; and col. 1, lines 4-20). The filter is designed to pass almost all of the solar radiation within the band of optical wavelengths to which the cell is sensitive, and reflects near infrared radiation that lies immediately adjacent the sensitivity band of the solar cell. Thus, it is the Examiner's position that negative interactions in the semiconductor of a solar cell having the cover will be reduced relative to the semiconductor of a solar cell receiving unfiltered sunlight. It is also the Examiner's position that light that is passed through to Aguilera et al's solar cell inherently includes the instant harmonics and heterodynes. By using said cover, Aguilera et al has made a determination as to the desirable and undesirable energies that can be applied to the solar cell, as per instant claim 14. Aguilera et al's solar cell is a silicon solar cell (i.e., a crystalline silicon solar cell) (see col. 7, lines 20-29). Since Aguilera et al teaches the limitations of the instant claims, the reference is deemed to be anticipatory.

In addition, the presently claimed requirement of reducing negative interactions within the solar cell photovoltaic substrate material relative to unfiltered light, and the instant harmonics and heterodynes would obviously have been present once Aguilera et al's solar cell with cover has been provided and used. Note In re Best, 195 USPQ at

Art Unit: 1753

433, footnote 4 (CCPA 1977) as to the providing of this rejection under 35 USC 103 in addition to the rejection made above under 35 USC 102.

Claim Rejections - 35 USC § 103

10. Claims 15, 16 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Samulon et al (U.S. Patent 3,076,861).

Samulon et al teaches a solar cell having an integral filter element (22), i.e., instant at least one means for modifying sunlight, that transmits only those wavelengths of incident solar radiation which are useful for conversion by the solar cell into electrical power (see col. 1, lines 13-72; and Figure 2). The other wavelengths of solar radiation, which are ordinarily dissipated in the form of heat in the solar cell without producing any useful electrical power, are reflected from the cell (see col. 2, lines 56-70). Figure 3 of Samulon et al shows that the filter element limits reception by the solar cell to that band of wavelengths for which the solar cell has maximum response (see col. 3, lines 48-69). Note from the "solar cell response" curve in Samulon's Figure 3 that the primary wavelength for the solar cell is at about 0.85 microns. It is the Examiner's position that said filter (22) minimizes the amount of destructively interfering wavelengths incident on the silicon wafer (12). It is also the Examiner's position that light that is passed through to Samulon et al's solar cell inherently includes the instant harmonics and heterodynes. Indeed, a harmonic of 0.85 microns is 0.425 microns, and seen in said Figure 3, the filter permits some transmission of 0.425 microns. By using the filter, Samulon has made a determination as to the desirable and undesirable energies that can be applied to the solar cell. The substrate (14,16) of Samulon et al's solar cell is silicon wafer, i.e.,

Art Unit: 1753

crystalline silicon (see col. 1, lines 13-28; and col. 2, lines 31-42). Figure 3 of Samulon shows the solar spectrum from about 300 nanometers to about 1400 nanometers.

Samulon et al teaches the limitations of the instant claims other than the difference that is discussed below.

Samulon et al does not specifically teach a step for determining at least one harmonic and at least one heterodyne. However, the determination of the harmonics and heterodynes for any of the wavelengths in Samulon et al's Figure 3 is a mental thought process, which is not deemed to distinguish the instant device or methods from what is disclosed in Samulon. Samulon et al's Figure 3 already has a primary wavelength, harmonics and heterodynes, and thus, determination of what is already in the prior art does not distinguish over the prior art. For example, a harmonic of the 0.85 micron primary wavelength is 0.425 microns, which is already present in the wavelengths that Samulon et al's filter permits to reach the silicon wafer. Thus, in the absence of anything unexpected, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have determined heterodynes and harmonics for the wavelengths in Samulon et al's Figure 3, in particular, for the primary wavelength of 0.85 microns, because the determination of known features that can be calculated by mental thought process and that are already present in the prior art, i.e., harmonics and heterodynes in said Figure 3, would have been within the level of ordinary skill in the art.

Double Patenting

11. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the

Art Unit: 1753

unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

12. Claims 1 through 20 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 17 through 35 of copending Application No. 10/478,189. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of said copending application, while not of the same scope as the instant claims, anticipate the instant claims.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Response to Arguments

13. Applicant's arguments filed November 11, 2006 have been fully considered but they are not persuasive. Applicant argues that the rejections of the claims over the references Samulon, Strebkov, Hashimoto and Aguilera are inappropriate and the

Art Unit: 1753

references are deficient. The examiner respectfully disagrees. As stated in the rejections above, each reference discloses blocking of wavelengths of light (corresponding frequencies of light) from reaching the solar cell. For example figure 3 of Samulon specifically shows the filter element preventing a number of frequencies from reaching the solar cell. This is the restriction of undesirable incident frequencies within the photoreactive portion of the solar spectrum from reaching the solar cell that applicant argues is not found in the references. As the references do disclose this limitation of the claims, the rejections are maintained.

Conclusion

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.


Art Unit: 1753

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony Fick whose telephone number is (571) 272-6393. The examiner can normally be reached on Monday thru Friday 7 AM to 4 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Anthony Fick ADF
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January 19, 2007


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